

Fig. 1

Prior Art

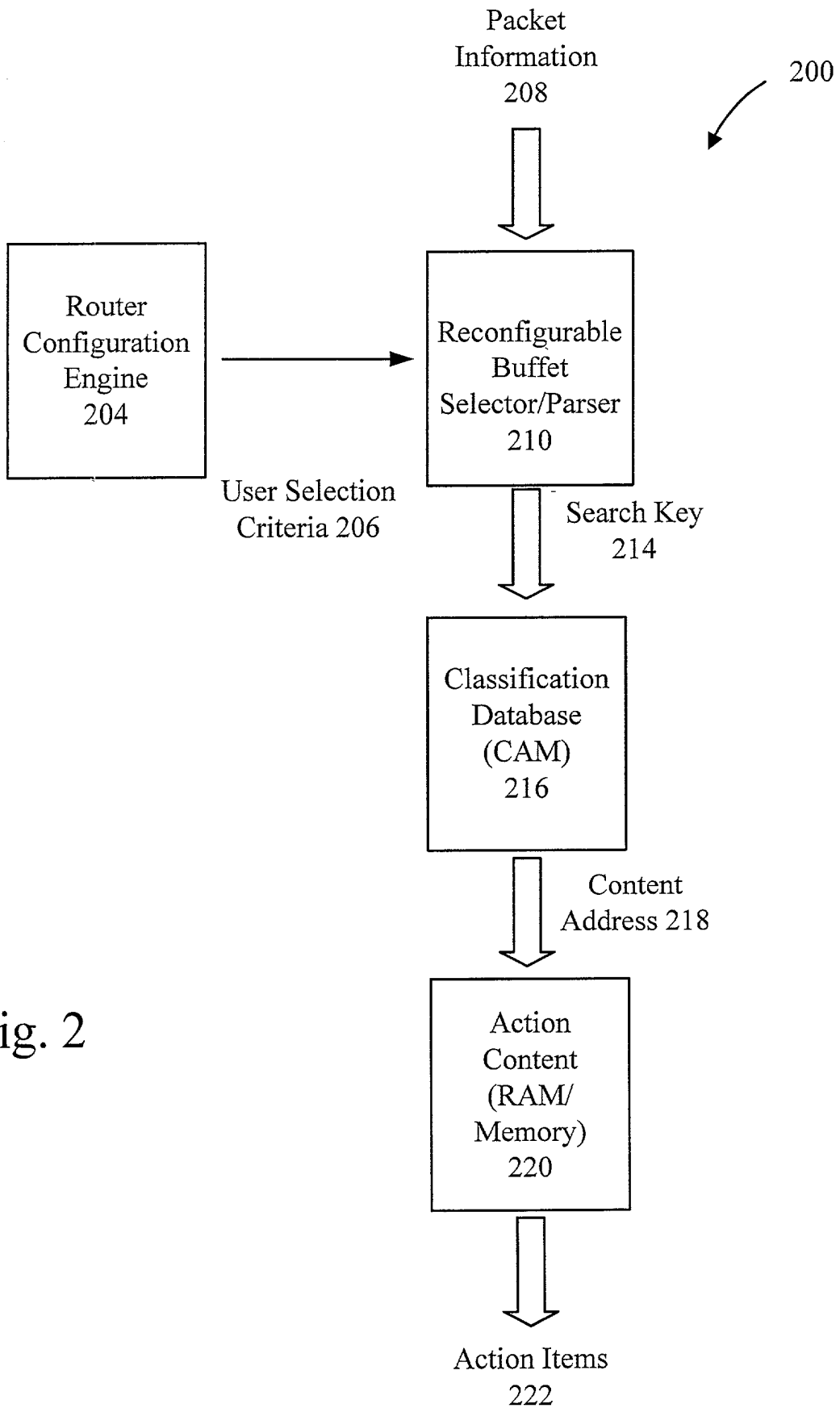


Fig. 2

# Fig. 3

Origin	Fields (number of bits)
<ul style="list-style-type: none"> <li>From Packet Status Information</li> </ul>	<ul style="list-style-type: none"> <li>Packet length</li> <li>Packet type: Ethernet, ATM, . . .</li> <li>Input/Output port</li> <li>802.1p tagged/untagged packet</li> <li>Incoming time of day</li> </ul>
<ul style="list-style-type: none"> <li>From OSI Layers:</li> </ul>	
<ul style="list-style-type: none"> <li>✓ Layer 2 Fields option</li> </ul>	<ul style="list-style-type: none"> <li>802.1p fields: <ul style="list-style-type: none"> <li>* Priority (3)</li> <li>* Vlan ID (12)</li> <li>* Tag/Untag (1)</li> </ul> </li> <li>Source Mac Address (48)</li> <li>Destination Mac Address (48)</li> <li>Ethernet-SNAP</li> <li>LLC DSAP (8) &amp; SSAP (8)</li> <li>Ethernet Type (e.g. IP, IPX, ARP, Appletalk, and so on.)</li> </ul>
<ul style="list-style-type: none"> <li>✓ Layer 3 Fields option</li> </ul>	<ul style="list-style-type: none"> <li>IP packet option <ul style="list-style-type: none"> <li>* Source IP (32)</li> <li>* Destination IP (32)</li> <li>* Protocol Type (8)</li> <li>* DSCP (6)</li> <li>* IP option (1)</li> </ul> </li> <li>IPX packet option <ul style="list-style-type: none"> <li>* Destination Network (32)</li> <li>* Destination Node (48)</li> <li>* Source Network (32)</li> <li>* Source Node (48)</li> <li>* Packet Type (8)</li> </ul> </li> </ul>
<ul style="list-style-type: none"> <li>✓ Layer 4 Fields option</li> </ul>	<ul style="list-style-type: none"> <li>IP packet option <ul style="list-style-type: none"> <li>* Source Port (16) (range)</li> <li>* Destination Port (16) (range)</li> <li>* TCP flag (6)</li> </ul> </li> <li>IPX packet option <ul style="list-style-type: none"> <li>* Destination Socket (16)</li> <li>* Source Socket (16)</li> </ul> </li> </ul>
<ul style="list-style-type: none"> <li>From bit-mask patterns specified by (<b>header</b>, <b>start</b>, <b>end</b>) where:</li> </ul>	<ul style="list-style-type: none"> <li>“header” means the header of a specific layer, and it could be L2, L3, L4, or L5.</li> <li>“start” means the starting bit from the header</li> <li>“end” means the ending bit from the header</li> </ul>

Fig. 4a

Packet Types	Field Name	Bits	Total Bits	Description
Basic Layer 2				
	Destination Mac Address	48		Destination Mac Address
	Source Mac Address	48		Source Mac address
			96	
Basic IP Layer 3				
	Source IP	32		Source IP address
	Destination IP	32		Destination IP address
			64	
Basic IPX Layer 3				
	Destination Network	32		Destination Network
	Destination Node	48		Destination Node
	Destination Network	32		Destination Network
	Destination Node	48		Destination Node
			160	
Basic Layer 4				
	Source IP	32		Source IP address
	Destination IP	32		Destination IP address
	Protocol Type	8		Protocol type
	Source Port	16		Source TCP/UDP ports
	Destination Port	16		Destination TCP/UDP ports
			104	
DiffServ-BA				
	DSCP	6		DSCP value
			6	
DiffServ-MF				
	Source IP	32		Source IP address
	Destination IP	32		Destination IP address
	Protocol Type	8		Protocol type
	Source Port	16		Source TCP/UDP ports
	Destination Port	16		Destination TCP/UDP ports
	DSCP	6		DSCP value
			110	

Fig. 4b

Packet Types	Field Name	Bits	Total Bits	Description
Web switching				
	Source IP	32		Source IP address
	Destination IP	32		Destination IP address
	Protocol Type	8		Protocol type
	Source Port	16		Source TCP/UDP ports
	Destination Port	16		Destination TCP/UDP ports
	TCP flag	6		Flag bits in TCP header
			110	
IP Filtering & Layer 2 QOS				
	Destination Mac Address	48		Destination Mac Address
	Source Mac Address	48		Source Mac address
	L2_priority	3		802.1p user priority
	Destination IP	32		Destination IP address
			131	
IP Layer 2-3 QOS				
	Source IP	32		Source IP address
	Destination IP	32		Destination IP address
	DSCP	6		DSCP value
	L2_priority	3		802.1p user priority
	Destination Mac Address (Or Source Mac Address)	48		Destination Mac address (or Source Mac Address)
			121	
IP Layer 2-4 QOS				
	Source IP	32		Source IP address
	Destination IP	32		Destination IP address
	Protocol Type	8		Protocol type
	Source Port	16		Source TCP/UDP ports
	Destination Port	16		Destination TCP/UDP ports
	DSCP	6		DSCP value
	L2_priority	3		802.1p user priority
			113	

Fig. 5

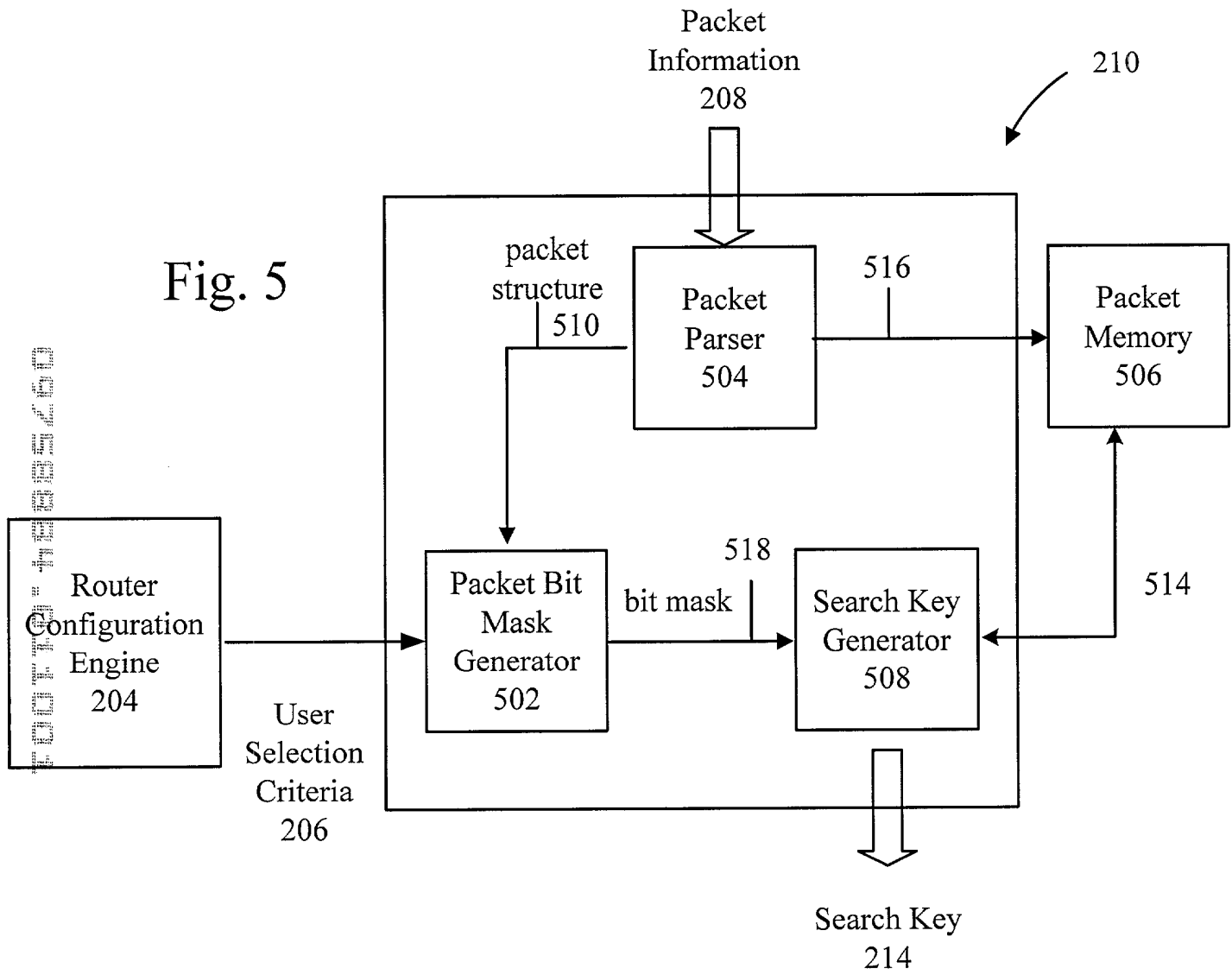


Fig. 6

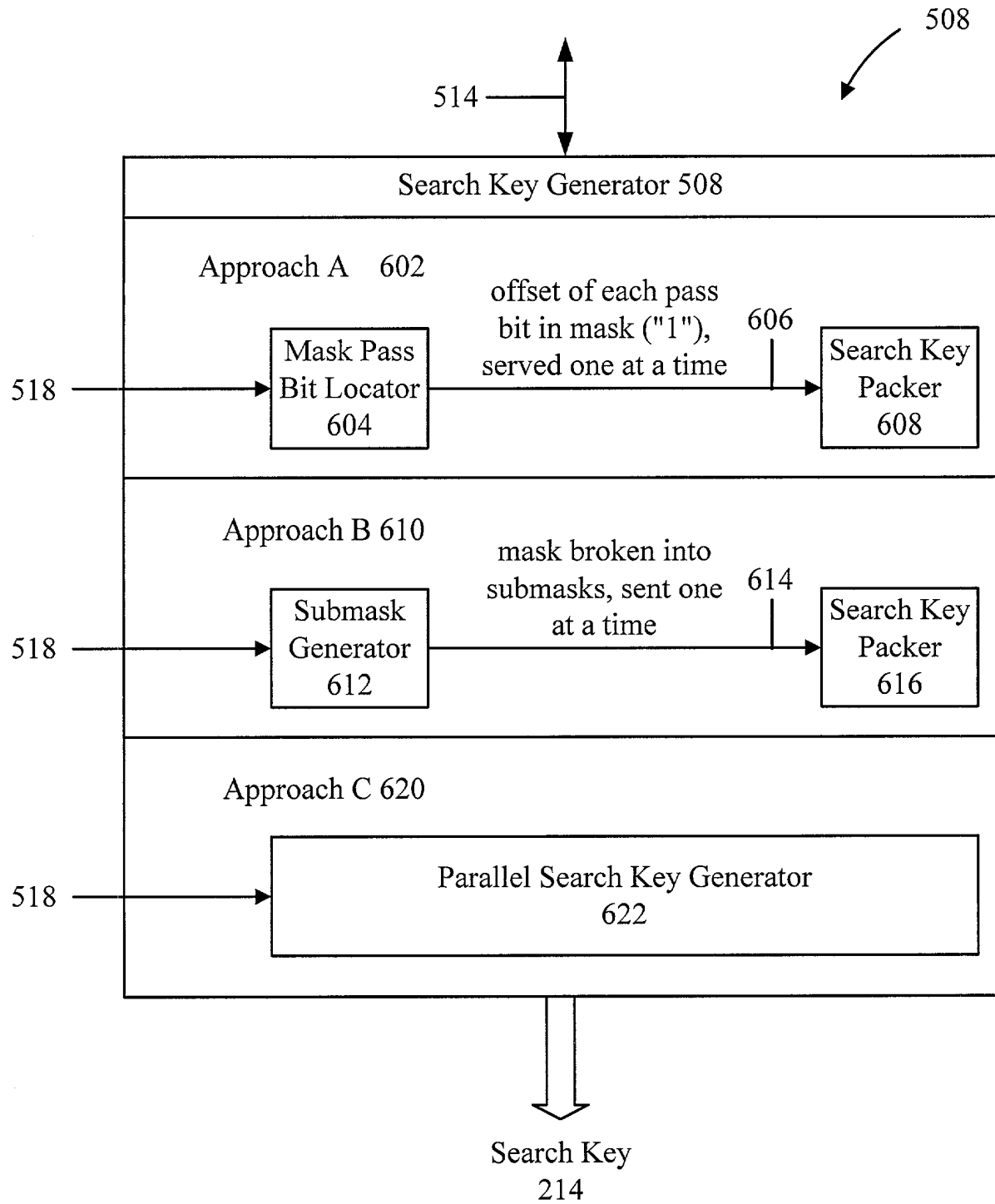
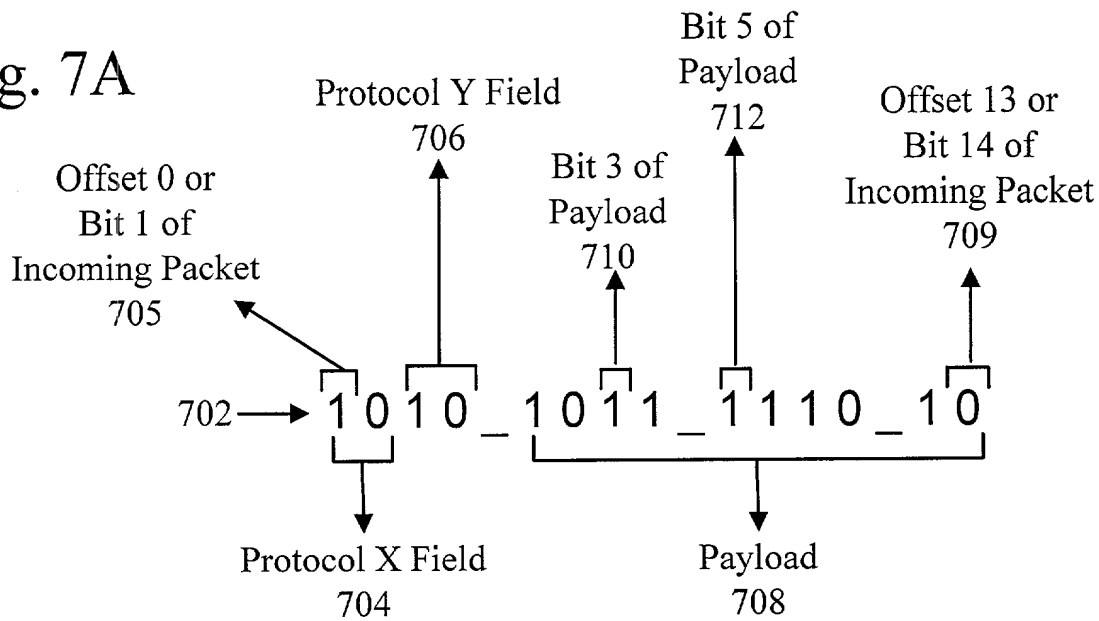


Fig. 7A



714 → 0011\_0010\_1000\_00

716 → 1011

Fig. 7B

1: Incoming packet passes through the packet parser into the packet memory. Concurrently, the packet structure information is sent to the packet bit mask generator.

2: The classification or the selection criteria and the packet structure information are input into the packet bit mask generator, which block outputs the bit mask 0011\_0010\_1000\_00.

3: One clock cycle at a time, the mask bit locator outputs the offset values 2, 3, 6, 8.

4: Offset 2 reads a "1" from memory, offset 3 reads a "0", offset 6 reads a "1", and offset 8 reads a "1"

5: The search key packer packs or collects these bits into the search key "1011".



Fig. 8

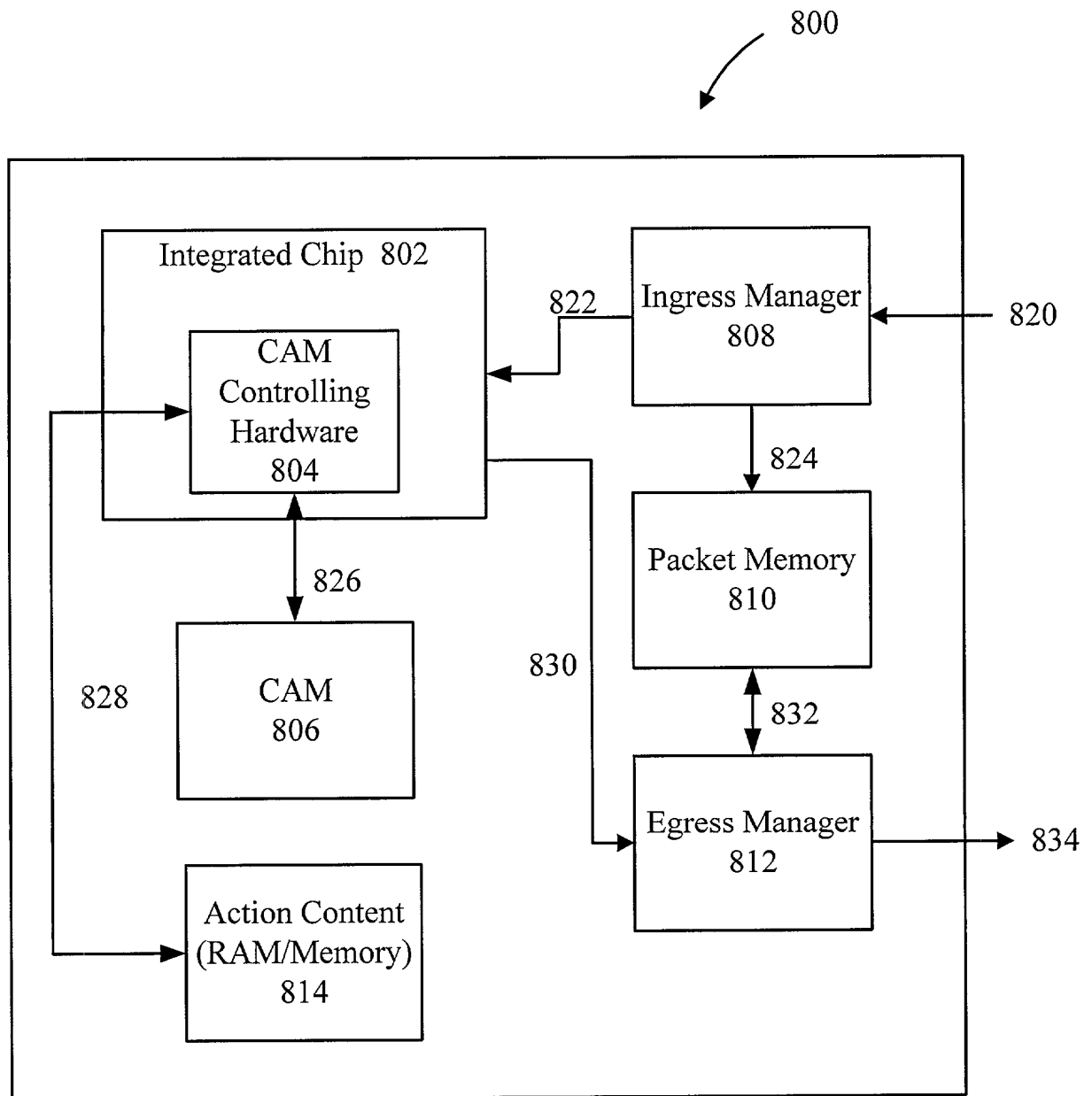


Fig. 9

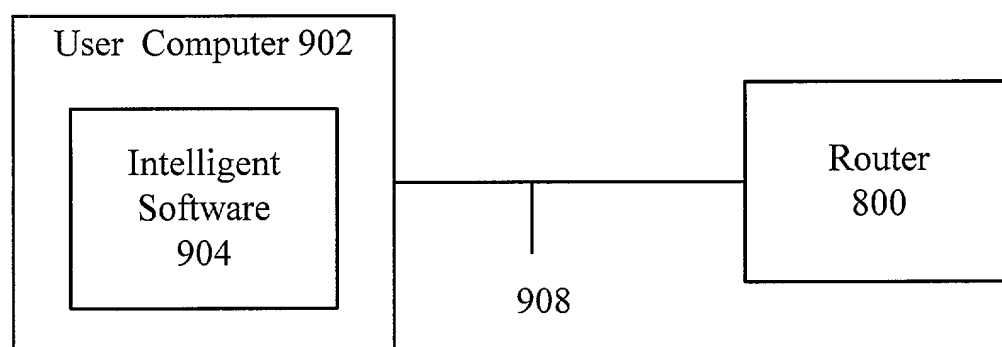


Fig. 10

